



HLA OMT Fundamentals



Integrated Training Program

Defense Modeling & Simulation Office
(703) 998-0660 Fax (703) 998-0667
hla@msis.dmsso.mil
<http://www.dmsso.mil/>

Background



Integrated Training Program

- **The formal definition of the HLA is composed of:**
 - **HLA Rules:** A set of rules which must be followed to achieve proper interaction of simulations in a federation execution. These describe the responsibilities of simulations and of the runtime infrastructure (RTI) in HLA federations.
 - **HLA Interface Specification:** Definition of the interface functions between the RTI and simulations participating in HLA federations.
 - **HLA Object Model Template:** Common presentation format for HLA Object Models.

Object Models



Integrated Training Program

- **Object models provide an identification of the set of objects chosen to represent the “real world” for a specific application, including:**
 - **Object characteristics (attributes)**
 - **Static object relationships (class hierarchies, associations, aggregations)**
 - **Dynamic object relationships (interactions)**
 - **Individual object behavior**

***Note: HLA Object View does not imply or require object-oriented implementation means**

HLA Object Models



Integrated Training Program

Federation Object Model (FOM): a specification of the exchange of public data among the participants in a HLA federation

- **Required information**
 - **Object Classes**
 - **Object Interactions**
 - **Attributes/Parameters**
 - **Lexicon**
- **Optional Information**
 - **Object Associations**
 - **Composition Relationships**
 - **Object Model Metadata**

HLA Object Models



Integrated Training Program

Simulation Object Model (SOM): a specification of the capabilities offered to federations by individual simulations

- **Same information categories as FOM**
- **Provides “logical” representation of imported and exported data**
- **Provides means of judging suitability of simulation systems to participate in HLA federations**
 - **Facilitated by automated browsing tools (in future) and current data standardization efforts**



HLA Object Model Template



Integrated Training Program

The HLA OMT is a standardized presentation format for describing HLA object models

- **Rationale:**

- **Facilitates FOM development coordination**
- **Provides a common means of describing potential federation members**
- **Facilitates the design and development of common FOM development toolsets**

OMT Components



Integrated Training Program

- **Object Class Structure Table**
- **Object Interaction Table**
- **Attribute/Parameter Table**
 - **Enumerated Datatype Table**
 - **Complex Datatype Table**
- **FOM/SOM Lexicon**

Object Class Structure Table



Object Class Structure Table			
<class> (<ps>)	[<class> (<ps>)]	[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]* | [<ref>]
		[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]* | [<ref>]
	
	[<class> (<ps>)]	[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]* | [<ref>]
		[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]* | [<ref>]
		[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]* | [<ref>]
...
<class> (<ps>)	[<class> (<ps>)]	[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]* | [<ref>]
		[<class> (<ps>)]	[<class> (<ps>)] [,<class> (<ps>)]* | [<ref>]
	
...
Air Vehicle(S)	Fixed Wing (S)	Fighter-Attack (S)	F-14 (PS)
			F-16 (PS)
			F-18 (PS)
		Bomber (S)	B-1B (PS)
		B-2 (PS)	
	Rotary Wing (PS)		

Object Interaction Table



Object Interaction Table							
Interaction Structure		Initiating Object		Receiving Object/Area		Interaction Parameters	Init/Sense/React
		Class	Affected Attributes	Class	Affected Attributes		
<interaction>	<interaction>	<class> [,<class>]*	[<attribute> [,<attribute>]* [(<comment>)]*	[<class> [,<class>]*	[<attribute> [,<attribute>]* [(<comment>)]*	[<parameter> [,<parameter>]*	<isr>
	<interaction>	<class> [,<class>]*	[<attribute> [,<attribute>]* [(<comment>)]*	[<class> [,<class>]*	[<attribute> [,<attribute>]* [(<comment>)]*	[<parameter> [,<parameter>]*	<isr>

<interaction>	<interaction>	<class> [,<class>]*	[<attribute> [,<attribute>]* [(<comment>)]*	[<class> [,<class>]*	[<attribute> [,<attribute>]* [(<comment>)]*	[<parameter> [,<parameter>]*	<isr>
...
Weapon Detonate	Weapon Denotate at Air Target	Weapon	Velocity, Acceleration, Weight, ⋮	Air Vehicle	VelocityWeapon Acceleration/Warhead, Weight, Weapon ⋮	Location, Attitude, ⋮	IR
	Weapon Denotate at Ground Target	...	...	...	...	...	...

Attribute/Parameter Table



Integrated Training Program

Object/ Interaction	Attribute/ Parameter	Data Type	Cardi- nality	Units	Resolution	Accuracy	Accuracy Condition	Update Type	Update Condition	T/A	U/R
<class> <Interaction>	<attribute> <parameter>	<datatype>	[<size>]	<units>	<resolution>	<accuracy>	<condition>	<type>	<rate> <condition>	<ta>	<ur>
	<attribute> <parameter>	<datatype>	[<size>]	<units>	<resolution>	<accuracy>	<condition>	<type>	<rate> <condition>	<ta>	<ur>
	...	...	[<size>]	...	...	...	...	...	...	...	...
<class> <Interaction>	<attribute> <parameter>	<datatype>	[<size>]	<units>	<resolution>	<accuracy>	<condition>	<type>	<rate> <condition>	<ta>	<ur>
	<attribute> <parameter>	<datatype>	[<size>]	<units>	<resolution>	<accuracy>	<condition>	<type>	<rate> <condition>	<ta>	<ur>
	...	...	[<size>]	...	...	...	...	...	...	...	...
<class> <Interaction>	<attribute> <parameter>	<datatype>	[<size>]	<units>	<resolution>	<accuracy>	<condition>	<type>	<rate> <condition>	<ta>	<ur>
...	...	...	[<size>]	...	...	...	...	...	...	...	...
Tank	Area	Float	1	m2	0.1 m2	perfect	always	conditional	scen events	TA	UR
	Velocity	Double	1	m/sec	1 m/sec	.01 m/sec	none	periodic	10 Hz	TA	UR
	State	Tank_Type	1	n/a	n/a	n/a	n/a	conditional	scen events	TA	UR
	Position	Rectng_Type	1	n/a	n/a	n/a	n/a	periodic	10 Hz	TA	UR
Weapon Detonate	Warhead	Wh_Type	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

OM Development Process



Integrated Training Program

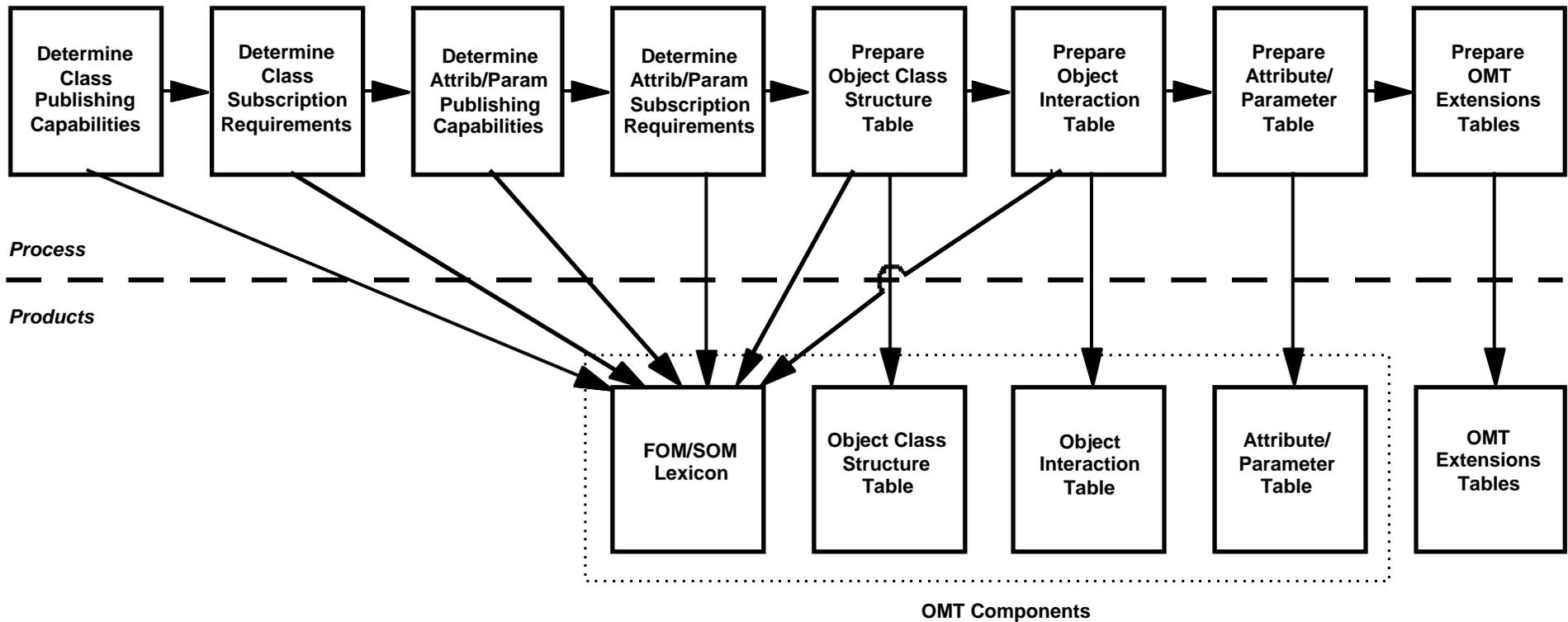
General Observations

- There are many potential processes which can lead to successful development of HLA object models
- Current process model driven by HLA protofederation experiences
- Object models facilitate, but do not by themselves guarantee, interoperability
- A process model for HLA object model development must evolve with supporting standards and infrastructure

SOM Development Process



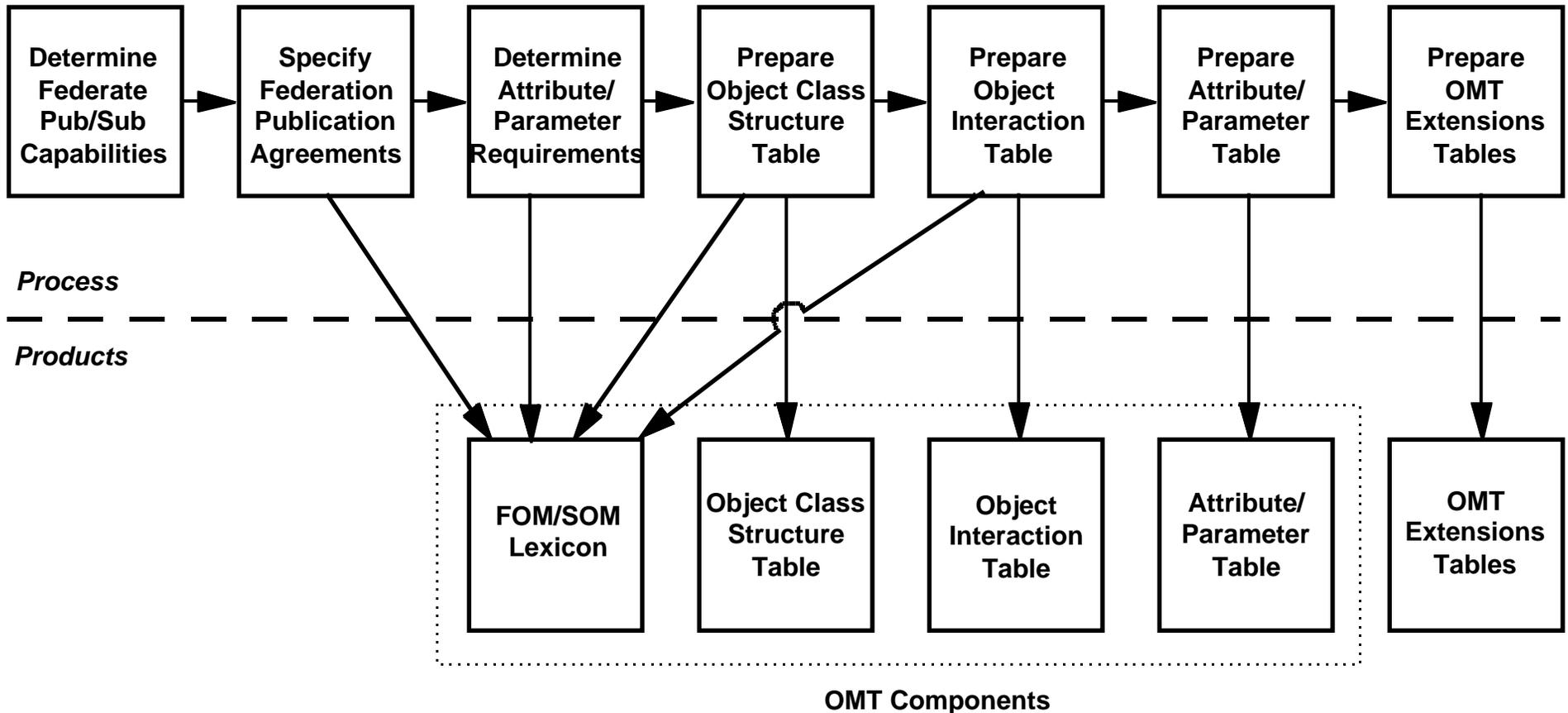
Integrated Training Program



FOM Development Process



Integrated Training Program





Related Documents



Integrated Training Program

- **OMT Extensions:** template for describing optional classes of information for HLA object models.
- **FEDEP Model:** a description of the process used to build and execute HLA federations.

DMSO Home Page — <http://www.dmsso.mil/>